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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/546,399	04/10/2000	Richard D. Hull	108949.101	2277

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EXAMINER

MORAN, MARJORIE A

ART UNIT

PAPER NUMBER

1631

DATE MAILED: 03/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/546,399

Applicant(s)

HULL ET AL.

Examiner

Marjorie A. Moran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2 and 4-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 April 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/6/04 has been entered. Claims 1-2 and 4-8 are pending. All rejections and objections not reiterated below are hereby withdrawn in view of the amendment to the claims.

***Specification***

The abstract of the disclosure is objected to because it is not directed to the claimed subject matter. Specifically, the abstract does not recite a method for calculating similarity between chemical compounds . Appropriate correction is required. See MPEP § 608.01(b).

***Drawings***

Figures 5 and 11-13 are objected to for the following reasons: The informal drawing of Figure 5 is not of sufficient quality to permit examination. It appears to be hand drawn, contains crossed out material and has hand-written comments lettered thereon. Figures 11 and 13 contain a stamp indicating that these figures are confidential material of a specific company. As all figures are published when an application is allowed, applicant is advised that this "confidential material" will become

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public upon issuance of any patent resulting from the instant application. Applicant may request that confidential material be expunged, but said request must be properly filed and timely received; no such request has been filed. See MPEP 724. Accordingly, replacement drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to this Office action. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action.

The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance. Applicant is given a THREE MONTH time period to submit new drawings in compliance with 37 CFR 1.81, said time period to run concurrently with the time period for reply to this office action. Extensions of time may be obtained under the provisions of 37 CFR 1.136(a). Failure to timely submit replacement drawing sheets will result in ABANDONMENT of the application. Any reply received before the filing of new drawings, or other action to overcome these objection, will be considered nonresponsive.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-2 and 4-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the resultant matrices" in step (e). The antecedent basis for this limitation in the claim is unclear. It is unclear if the "resultant matrices" are those produced in step (c) or that created in step (d), therefore the claim is indefinite.

Step (e) of claim 1 recites a step of "using" matrices to calculate similarity between a probe and a compound. It is unclear what actual method step is intended for the term "using"; i.e. multiplying/dividing/adding/subtracting one matrix with another, or with a vector, performing another dimension reduction on "at least one" matrix or matrices, transforming one matrix with another, transforming matrix with a vector or column, etc. The specification discloses on pages 9 and 28 that similarity between a matrix between compounds in a collection and a pseudo object representing a probe may be calculated by computing a dot-product of a normalized vector with each row of a matrix, or by computing dot products between rows of a matrix; however, this is merely exemplary, and the claim is not so limited. As the positive, active method step intended for step (e) is unclear, the claim is indefinite. It is noted that claim 5 explicitly recites steps for calculating similarity, consonant with the disclosure of the specification, and is not rejected herein for this reason. However, as claim 5 fails to remedy other problems causing indefiniteness in parent claims 1 and 4, it is still indefinite.

Claim 4 recites a term in parentheses. As it is unclear whether the term in parentheses is intended to be a positive limitation of the claim, the presence of

parentheses renders the claim indefinite. This rejection may be overcome by deleting the parentheses and inserting --wherein-- after "matrix" in line 5 of claim 4.

Claim 4 recites the limitations "the eigenvectors" in lines 6 and 8. There is insufficient antecedent basis for these limitations in the claim, therefore the claim is indefinite. This rejection may be overcome by deleting "the" before each recitation of "eigenvectors".

Claim 4 recites the term "the eigenvalues" in the last line of the claim. The antecedent basis for this term is unclear. It is unclear whether "the eigenvalues" are the nonzero eigenvalues of the  $P$  matrix or the  $Q$  matrix recited in previous lines, therefore the claim is indefinite.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1 and 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over ALSBERG (Chemometrics Intelligent Lab Syst (1990) vol. 8, no.2, pp. 173-182) in view of DEERWESTER (US 5,778,362).

ALSBERG teaches a method of calculating the similarity of chemical compounds by representing attributes (descriptors) of the compounds as vectors in a matrix, performing statistical analysis of the matrix, and comparing the results of a one matrix with another (p. 173, abstract). ALSBERG specifically teaches that his columns/vectors comprise structure descriptors (p. 173, left column), and teaches output of his results (p. 177). ALSBERG does not teach that his matrices comprise a frequency of each descriptor, nor does he teach singular value decomposition (SVD) nor the matrices of claims 4-8.

DEERWESTER teaches a method of determining the similarity between pairs of elements of a set which he calls "structure analysis" using matrix calculations and singular value decomposition (col. 6, lines 34-62). He teaches the same matrices and computations as those recited in claims 4-8 (col. 3, line 60-col. 4, line 12 and col. 5, lines 1-50). DEERWESTER further teaches that his vectors comprise frequency distributions (col. 5, lines 1-5).

It would have been obvious to one of ordinary skill in the art at the time of invention to have included frequency distributions and to have used the matrix analysis and SVD of DEERWESTER in the method of ALSBERG where the motivation would

have been to more effectively analyze large data sets to identify similar structures, including those which are otherwise implicit or hidden, as taught by DEERWESTER (col. 1, lines 25-68).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over ALSBERG (Chemometrics Intelligent Lab Syst (1990) vol. 8, no.2, pp. 173-182) in view of DEERWESTER (US 5,778,362) as applied to claims 1 and 4-8 above, and further in view of CRAMER et al. (US 6,185,506).

ALSBERG and DEERWESTER make obvious method of calculating the similarity of chemical compounds by matrix analysis, as set forth above. ALSBERG teaches use of structural descriptors and DEERWESTER teaches structural analysis, also as set forth above, but neither specifically teaches an atom pair descriptor or topological torsion descriptor.

CRAMER teaches comparison of chemical compounds using CoMFA (topomeric/torsional) and Tanimoto (atomic) descriptors (col. 9, line 52-col. 10, line 64).

It would have been obvious to one of ordinary skill in the art at the time of invention to have included the descriptors of CRAMER as the structure descriptors in the method of ALSBERG and DEERWESTER where the motivation would have been to use validated molecular structure descriptors in a search for particular compounds, as taught by CRAMER (col. 10, lines 11-26). One skilled in the art would reasonably have expected success in using the descriptors of CRAMER in the method of ALSBERG and



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DEERWESTER because CRAMER specifically teaches that CoMFA descriptors may be used to identify similar structures (col. 19, lines 57-61).

### ***Conclusion***

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marjorie A. Moran whose telephone number is (571) 272-0720. The examiner can normally be reached on Mon,Wed: 7-1:30; Tue,Thur: 7:30-6; Fri 7-3:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ardin Marschel can be reached on (571)272-0718. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Marjorie A. Moran  
Primary Examiner  
Art Unit 1631

*Marjorie A. Moran*  
3/17/05